SYSTRON DONNER

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SYSTRON DONNER
Member THORN EMI Group

VP28-50 S7059

INSTRUMENT DIVISION

POWER SUPPLIES

DOCUMENT NO. 120026-51

OPERATING AND SERVICE MANUAL

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TEST & MEASUREMENT GROUP OF SYSTRON DONNER WARRANTY POLICY

I Warranty

The Test & Measurement Group of Systron Donner warrants that at the time of shipment the products manufactured by Systron Donner's T & M Group and sold hereunder will be free from defects in material and workmanship and will conform to the specifications furnished by or approved in writing by Systron Donner's T & M Group.

II Warranty

A **The warranty period for products published in our latest product catalog will be one year from the date of shipment. This warranty is extended only to the original buyer.**

B The warranty period for products published in prior catalog, will be 90 days from the date of shipment.

C The warranty period for modified standard products, custom products, or new spare part assemblies will be 90 days from the date of shipment.

D The warranty period for systems or assemblies of miscellaneous components and products will be limited to the warranty for the stand alone component or instrument. The system itself is not guaranteed unless a specific installation and service agreement has been negotiated between Systron Donner and the customer. In this latter case, the warranty period will be 30 days after the installation of the system while the various portions of the system will be limited to the normal component or instrument stand alone warranty, and for non Systron Donner material within the system that is furnished by Systron Donner the warranty will be limited to the supplier's normal warranty.

III Warranty Adjustments

A If any defect within this warranty appears, Purchaser shall notify Seller immediately.

B Systron Donner's T & M Group agrees to repair or furnish a replacement for, but not install, any product which, within the standard warranty shall, upon test and examination by Systron Donner's T & M Group, prove defective within the above warranty period.

C No product will be accepted for return or replacement without the written authorization of Systron Donner's T & M Group. Upon such authorization and in accordance with instructions by Systron Donner's T & M Group, the product will be returned to the original manufacturing location, shipping charges prepaid by Purchaser.

IV Exclusions from Warranty

A The foregoing warranty is in lieu of and excludes all other expressed or implied warranties of merchantability or fitness or otherwise.

B Systron Donner's T & M Group will not be liable for any special or consequential damages or for loss, damages or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with any other equipment or material, or from any other cause.

C The warranty does not extend to any product manufactured by Systron Donner's T & M Group which has been subjected to misuse, neglect, accident, improper installation or to use in violation of instructions furnished by Systron Donner's T & M Group.

D The warranty does not extend to or apply to any unit which has been repaired or altered at any place other than at a Systron Donner T & M Group factory, by persons not expressly approved by Systron Donner's T & M Group, not to any unit, the serial number of which has been removed or defaced or changed.

E This warranty applies to new equipment only and will cover repaired or replacement items only to the extent of the balance remaining of the items original warranty period noted above in Paragraph II.

F All freight charges will be paid for by the Purchaser.

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ACD Division – Sunnyvale, CA
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January 1982

SYSTRON DONNER
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SECTION I
DESCRIPTION

1.1 INTRODUCTION

The ValuPower Series power supplies are flexible and dependable sources of DC power, which can be used to meet a variety of needs. These needs may range in scope from inspection and production testing, to laboratory bench testing, IC and systems applications.

The voltage adjustment range makes these units well suited for specific systems applications. The ability to provide power packaged in minimum space with high reliability and performance meets the demands of most systems requirements.

This instruction manual provides general characteristics and specifications, operating procedures, theory of operation, maintenance and calibration, parts lists and related schematics for the ValuPower Series power supplies.

1.2 GENERAL FEATURES

Adjustable current limiting, low noise for IC and Systems applications, slot voltage models, current to 300 amps, positive convection cooling, automatic load share paralleling, remote sensing and programming, extremely low output impedance, overvoltage protection,UL design standards and no turn on/turn off transients are featured in the ValuPower Series power supplies. Output, Sensing, Automatic "Load Share" paralleling and Remote programming terminals are located on a barrier strip mounted on the rear panel of the unit. The AC power switch, AC pilot lamp, voltage control, and appropriate optional metering devices are all located on the front panel.

1.2.1 Constant Voltage Mode

A constant voltage is maintained across the output terminals at any preset value within the rated slot voltage range, provided that the load does not draw any more than either the rated output current or more than the preset limiting current value determined by the top recessed current control setting.

1.2.2 Automatic Foldback Current Limiting

Short circuit protection is provided by the automatic current limiting circuit which limits the maximum output current under all load conditions. The point at which automatic current limiting occurs is variable and may be selected anywhere between 40% of the rated output current and maximum rated output current of the unit. In the event of an overload, the current and voltage foldback into a safe operating region. In the event of a short circuit, the output current is limited to approximately 40% of the rated current.

1.2.3 Remote Programming

Remote programming is provided in the voltage mode of operation and may be utilized over the entire voltage range of the unit. The scale factor for remote voltage programming is approximately 250 ohms per volt.

1.2.4 Automatic "Load Share" Paralleling

Automatic "Load Share" Paralleling permits interconnection of up to four supplies so that each supply in parallel delivers an equal amount of current to the load, with single knob voltage control of all units.

Adjustable overvoltage (OV) protection is standard on all the ValuPower Series power supplies. This protection provides special circuitry to prevent the output from exceeding a preset voltage. An external adjustment control recessed in the top cover is provided to vary the point at which the OV circuit will activate. The overvoltage crowbar will latch when an overvoltage condition occurs and must be reset by cycling the AC input power off and on again. The OV Protection point should not be set lower than one (1) volt above the minimum power supply voltage rating or 5.5 V minimum.

1.3 PRECAUTIONARY MEASURES

1.3.1 Wire Size

To assure proper regulation under all load conditions and to prevent severe distortions of the AC line voltage, it is very important to take into consideration the physical size and current handling capabilities of the input power line. Serious losses in regulation and an increase in ripple may result from underrated or overloaded AC input lines. The maximum AC impedance from the breaker box to the power supply should not exceed 0.5 ohms.

1.3.2 Systems Considerations

In systems applications it is recommended that each power supply input power line be run separately to the AC distribution box in order to minimize cross coupling and interaction between equipment. Do not run sensitive signal leads such as the remote sensing leads in the same cable as the AC input without shielding. To keep the AC ripple in the output to a minimum, it is recommended that the AC input cables should not be run in close proximity to the output load cables.

1.3.3 Terminal Post Resistance

All terminals and shorting links serving sensing and programming "-" outputs must be securely tightened before use. Serious loss of regulation and an increase in ripple can result due to a voltage drop caused by loose terminals and shorting links.

The specifications cited herein for regulation and ripple can be readily attained on every power supply providing the proper method of measurement is employed. The major consideration is that the highly stable meter and oscilloscope, specified

in the calibration procedures, must be connected to the sensing terminals and not the load terminals. The reason for this precaution is that the voltage drop between the load terminals and sensing terminals will yield an inaccurate regulation ripple measure.

1.4 SPECIFICATIONS

Table 1-1 is a complete list of standard specifications for the ValuPower Series Power Supplies.

TABLE 1-1 SPECIFICATIONS

ELECTRICAL SPECIFICATIONS	
Input:	105-132 VAC, 57-65 Hz, 1 ϕ. 50 ampere continuous. 75A for 150 ms, low duty cycle.
Output:	Floating; Isolated from ground, 300 VDC maximum. Internal protection is provided for applied reverse voltage.
Regulation Line:	±0.02% or 5 mV[1], for full range line change.
Regulation Load:	0.05% or 5 mV[1], for no load to full load.
Ripple:	Less than 1 mV RMS; total ripple and noise less than 5 mV p-p or 0.05[1]% to 10 MHz.
Stability:	0.05% or 10 mV[1], for 8 hours after 30 minute warm-up. Measured at constant line, load and ambient temperature.
Temperature Coefficient (Per °C):	0.05%.
Temperature Range:	-20°C to +55°C.
Temperature Storage:	-55°C to +85°C.
Recovery Time:	50 microseconds to within 30 mV for a Δ 1 change as shown in the table.
Overload Portection:	Automatic Electronic Current Foldback with instantaneous automatic reset. Adjustable from 40% to 100% of rated load. (A minimum short circuit current of 10% will be delivered into any class of load, ensureing proper operation with most non-linear loads). All models have thermostatic thermal protection.
AC Power Input Protection:	Front Panel Circuit Breaker.
Remote Programming:	Programmable over rated voltage range. Scale factor approximately 500 ohms/volt.
Voltage Adjustment Range:	Continuously adjustable over 22 to 30 VDC. Accuracy 0.1%.

TABLE 1-1 SPECIFICATION (Cont'd)

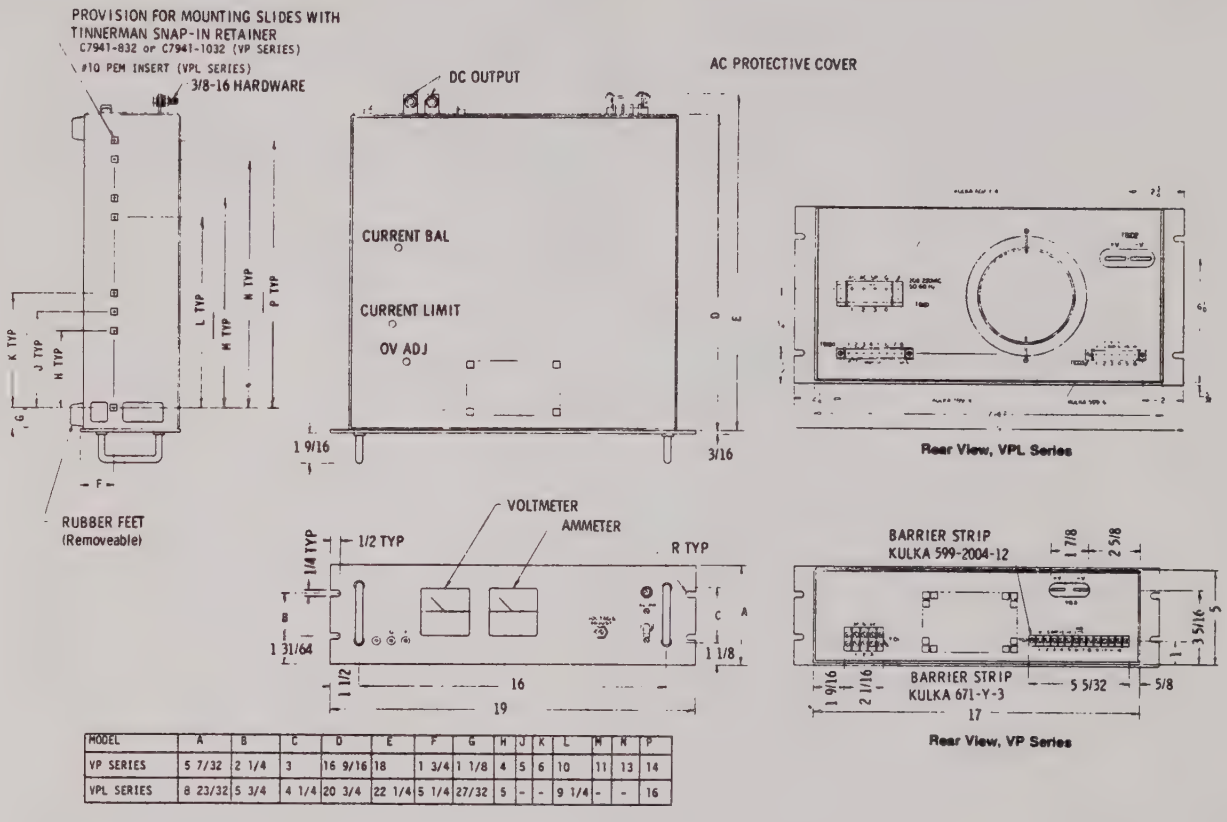
ELECTRICAL SPECIFICATIONS (Cont'd)	
Remote Sensing:	Maintains rated regulation directly at the load. Maximum line drop 0.5 V per leg is included in voltage range. Internal protection is supplied for open sensing leads.
Paralleling:	Automatic Load Share Paralleling with single knob control of up to four units.
GENERAL AND PHYSICAL SPECIFICATIONS	
Design Principle:	Precision Series Pass Regulation.
Operational Modes:	Constant Voltage with Automatic Current Foldback Protections.
Controls:	
Voltage:	Continuous voltage adjustment, front panel screwdriver locking adjust.
Current:	Top recessed adjustment, 40% to 100%.
Input Power:	Front panel AC ON switch and power indicator.
Current Balance:	Top recessed adjustment for auto load-share paralleling.
OV Adjust:	Top recessed adjustment potentiometer.
Metering:	
Voltage:	Front Panel Voltmeter
Current:	Front Panel Ammeter
Rear Panel Power Output Terminals:	(TB-3) 3/8-16 heavy duty terminals for +V and -V.
Rear Panel Barrier Strip:	(TB-1) (1) AC; (2) Ground G; (3) AC. (TB-2) (1) Negative Output -V; (2) Negative Sensing -S; (3) Remote Voltage Programming RVP; (4) Positive Sensing +S; (5) Positive Output +V; (6-7) Paralleling PAR; (8-12) Spares.
Universal Slide Mounting:	Integral provisions are made for rapid mounting of commonly specified centerline mounting, slide assemblies (in-line screw centers). Typical slide assemblies are Emcor series 20, Grant series 4435 and Jonathan series 120qd.

TABLE 1-1 SPECIFICATIONS (Cont'd)

GENERAL AND PHYSICAL SPECIFICATIONS (Cont'd)

	To utilize slides, add snap-in mounting nuts Tinnerman type, C7941-832B(8/32"), C7941-;032-3B(10/32"). When ordering, specify nut size and positioning per outline drawing. No charge for factory installation.
Overvoltage Protection:	Automatic fast acting, adjustable overvoltage protection with recessed adjustment.
Dimensions:	5-1/4" x 19" (EIA) x 18-1/8"
Weight:	85 lbs.

NOTES: [1]Whichever is greater.



Rear View, VPL Series

Rear View, VP Series

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P
VP SERIES	5 7/32	2 1/4	3	16 9/16	18	1 3/4	1 1/8	4	5	6	10	11	13	14
VPL SERIES	8 23/32	5 3/4	4 1/4	20 3/4	22 1/4	5 1/4	27/32	5	-	-	9 1/4	-	-	16

SECTION 2

INSTALLATION AND OPERATION

2.1. MECHANICAL INSTALLATION

When the ValuPower series power supply is used in a rack or bench type configuration, no special mechanical installation is required. However, integral slide mount provisions are made for rapid mounting of commonly specified centerline mounting slide assemblies (in-line screw centers).

2.2. ELECTRICAL CONNECTIONS

Input Power

A three-terminal for VP series and four terminal for VPL series barrier strip mounted on the rear panel provides AC input connections to the unit.

The power handling ability of the AC power lines feeding AC power to the unit must be considered, as serious losses in regulation and substantial increase in ripple may occur as a result of insufficient power capacity of these lines. All AC power line connections must be securely tightened and any movable electric contact surface (such as the wiper arm of a variable transformer) should be kept clear of impedance producing oxide coatings.

Care should be exercised in selecting the proper wire size for the AC input lines. The AC wire size should be sufficient so that the line drop does not exceed a value which will allow the input voltage to drop below the specified lower limit.

An AWG #14 should be adequate for most short runs of 20 ft. or less. Increase wire size to #12 for up to 50 feet and to #10 for up to 100 feet.

Output, Rear Panel

Barrier strips mounted on the rear panel provide sensing, programming, automatic "Load Share" paralleling and ground connections. A heavy duty block containing two (2) stud type terminals is provided for output connections.

Output, Front Panel

Three insulated tip jacks mounted on the front panel provide output and ground connections. These terminals are provided for test convenience purposes, and for easy monitoring of the output. They should not be used to draw Load Current. To achieve optimum regulation, load current must be extracted from the output block mounted on the rear panel.

NOTE: Units equipped with (OV) option should be adjusted for proper overvoltage protection. For procedure see Page 4-2 OVERVOLTAGE SENSITIVITY.

2.3 OPERATING CONFIGURATIONS

The ValuPower series power supplies are designed to operate as highly regulated constant voltage sources with automatic foldback current limiting. There are various operating configurations that can be used by proper application of shorting links and wiring. The following paragraphs describe the various operating configurations and their connections.

Local Voltage Programming (Fig.2-1 & 2-1A)

To adjust the output voltages from the power supply, connect a shorting link across terminals -S and RVP. With this shorting link installed, the voltage adjust control provides adjustment of the output over the rated slot voltage range.

Remote Voltage Programming (Fig. 2-2 & 2-2A)

Remote voltage programming is achieved by removing the shorting link from terminals -S and RVP and substituting a resistive element of proper value across terminals -S and RVP external to the power supply.

Sensing Connections

Local Sensing (Fig. 2-1 & 2-1A)

Local sensing connections are made when rated regulation is not required directly at a remote load.

Connect the load to output studs +V and -V and ascertain that shorting links are connected between terminals -V and -S and +S and +V.

Remote Sensing (Fig. 2-3 & 2-3A)

Remote sensing is used when rated regulation is required at a remote load.

Remove the shorting links between terminals -V and -S and +S and +V. Using a twisted, shielded pair of wires, connect the -S and +S sensing terminals to the load. To prevent damage to the power supply, correct polarity of both the remote sensing and output leads must be observed. The negative remote sensing lead (-S) and negative output lead (-V) must be connected to one side of the load and the positive remote sensing lead (+S) and positive output lead (+V) connected to the other side of the load. The shield should be grounded at the power supply end of the cable.

2.4 CONTROLS

Front Panel

AC ON - circuit breaker controls power
Voltage Adjust - Potentiometer, adjusts voltage output.

Top Cover (Recessed controls)

Current Limit - Potentiometer, adjusts current limiting point.
Current Balance - Potentiometer, adjusts load sharing in parallel use
OV Adjust - Potentiometer, adjusts overvoltage protection point.

VP SERIES CONNECTIONS

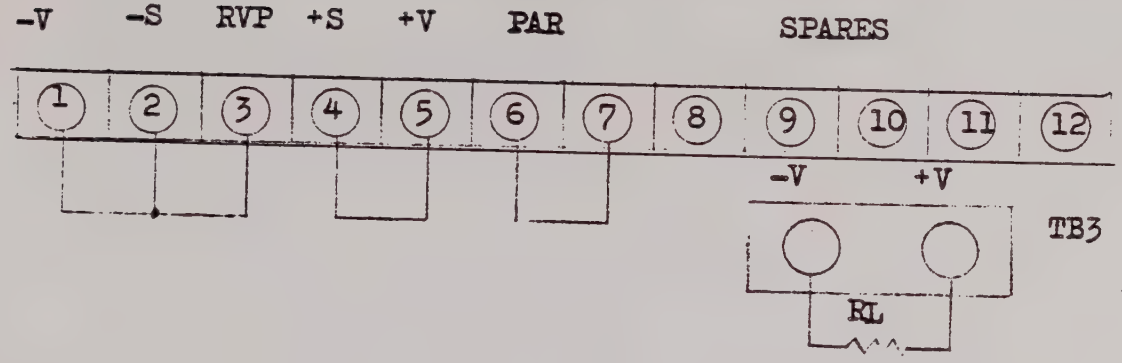


Fig 2-1
Local Prog
Local Sens

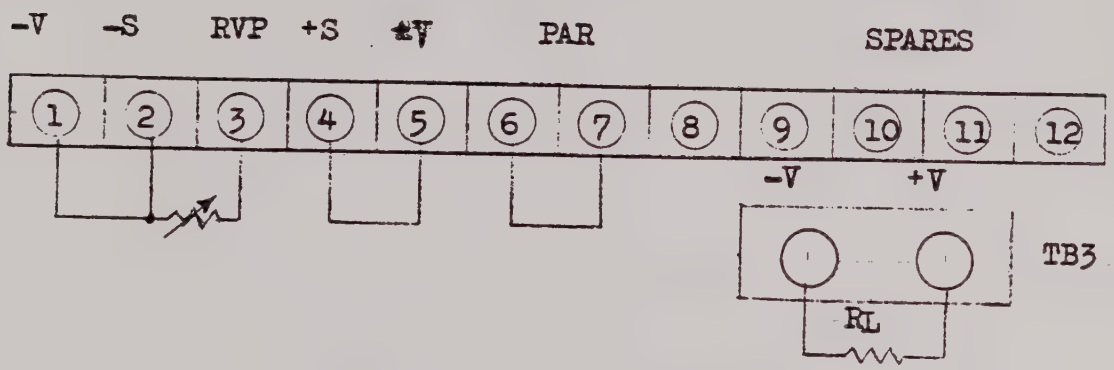


Fig. 2-2
Remote Prog.

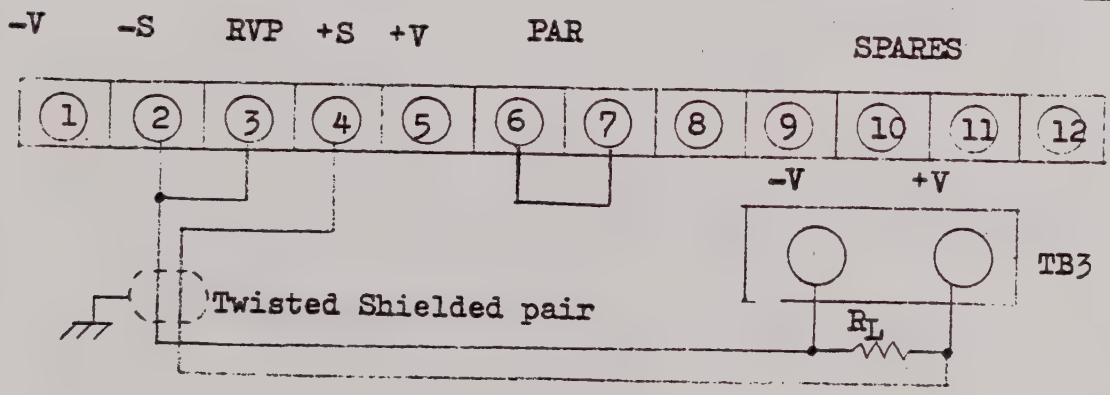


Fig. 2-3
Remote Sense

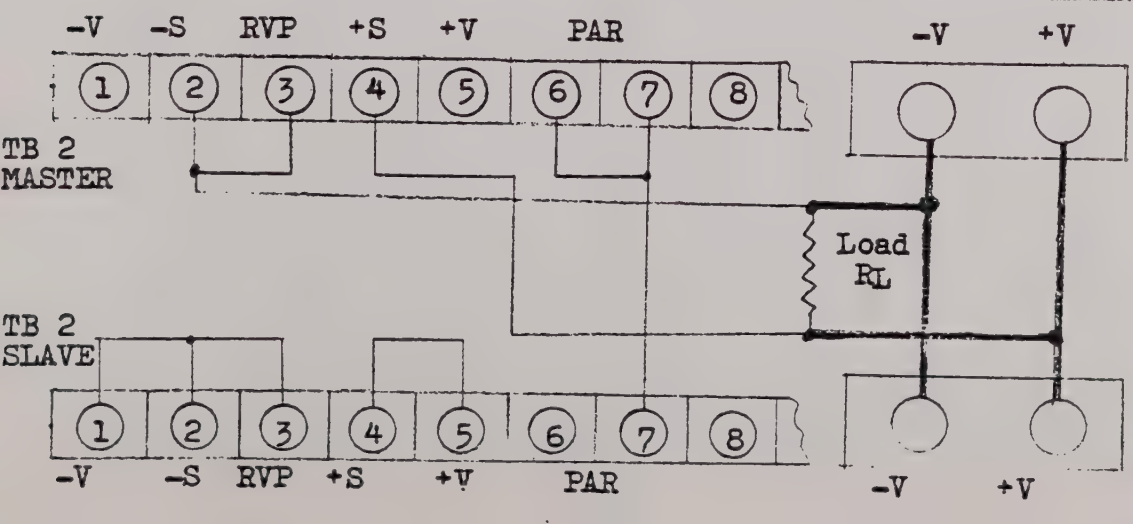


Fig. 2-4
Auto Parallel

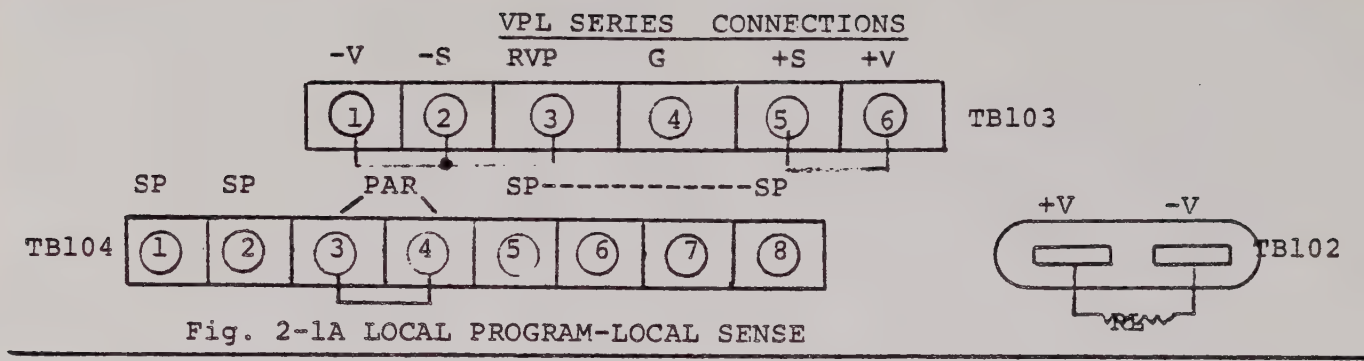


Fig. 2-1A LOCAL PROGRAM-LOCAL SENSE

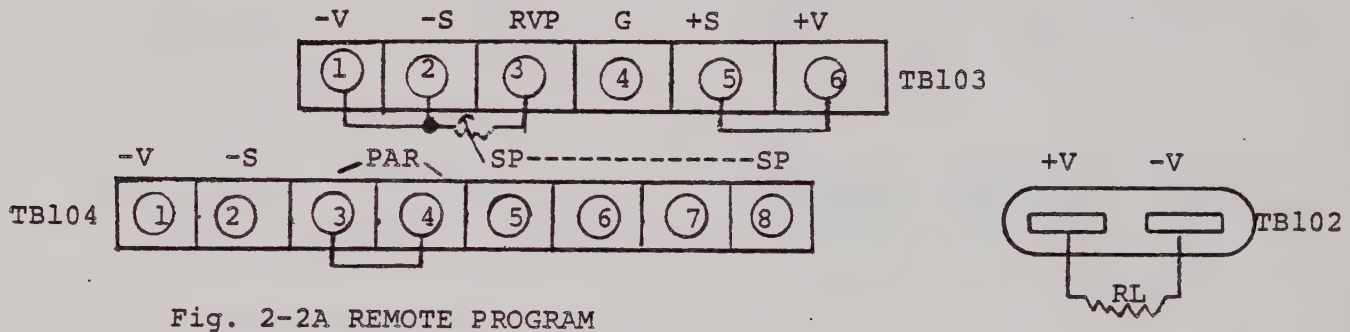


Fig. 2-2A REMOTE PROGRAM

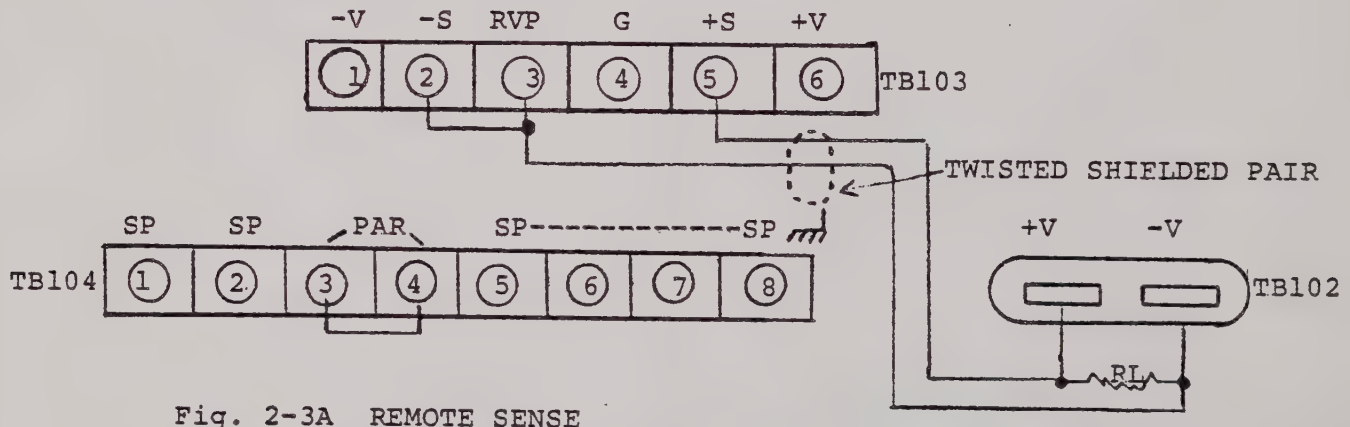


Fig. 2-3A REMOTE SENSE

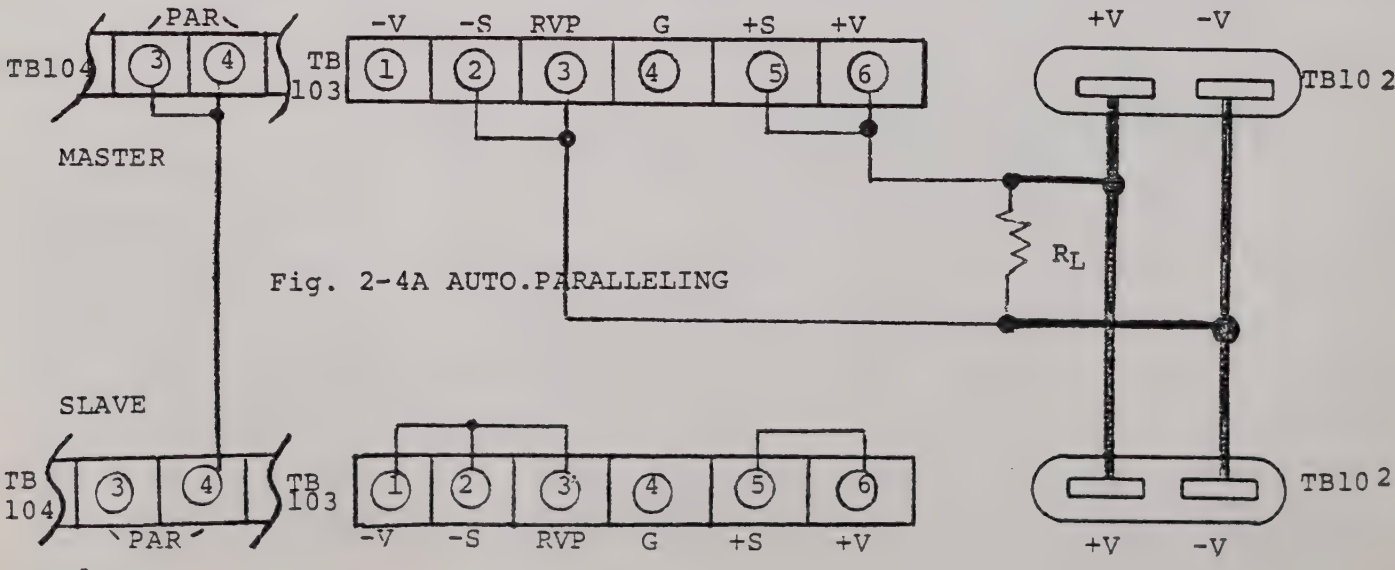


Fig. 2-4A AUTO.PARALLELING

Internal

All internal control settings have been factory preset and require no additional adjusting. However, if it should become necessary to adjust any of the internal controls due to circuit changes caused by component aging or replacement, refer to the calibration section of this manual.

2.5 OPERATION

Control Settings

Set front panel control fully CCW, top recessed controls fully CW.

Shorting Links

Prior to the application of power, connect all loads, external wiring and shorting links required for the mode of operation desired.

Grounding

Either side of the output may be grounded, or the output may be used in a floating condition.

Power On

Connect the unit to a nominal AC input power source. Set AC power ON swtich to on, and observe that pilot lamp is lit.

Warm Up

No warm up time is necessary to place the unit into operation. However, a 30-minute warm up period is recommended to reach rated stability. The unit is now ready for operation.

2.6 AUTOMATIC LOAD SHARE PARALLELING

General (Fig. 2-4 & 2-4A)

To operate two or more power supplies in the automatic load share paralleling mode, select one unit as a master and the other units as slaves. Set the front panel control on the slaves fully CW and disconnect the jumper between terminals 6 and 7 on TB2, (3 and 4 on TB104.) With the jumper on the master connected between terminals 6 and 7 on TB2,(3 and 4 on TB104,)connect terminal 7 on TB2,(4 on TB104)on the master to terminal 7 on TB2,(4 on TB104)on all the slaves.

Use leads of approximately equal resistance for connecting load to +V terminals, or strap +V terminals directly together if near each other and use a single load from the master terminal.

Remote sensing need only be done with the master terminals. Remove jumpers from between terminals -V and -S and terminals +S and +V on master and run leads from -S to - side of load and from +S to + side of load. Leave jumpers in place on slave units.

SECTION 3

THEORY OF OPERATION

3.1 GENERAL

The purpose of the ValuPower series power supplies is to transform and rectify the AC input into a well regulated, stable and adjustable DC output. The following paragraphs describe the major circuits used in the power supply. As each circuit is described, reference should be made to both the Block Diagram, Figure 3-1 and the Schematic Diagram in the rear of this manual.

Primary Input

Input power is obtained through power transformers, power rectifiers, and filter capacitors. When power circuit breaker CB 101 is set to ON, AC pilot lamp DS 101 glows and AC power is applied to T101 and cooling fan B101. Regulated DC output voltage is immediately available from the power supply.

Series Regulator

The rectified voltage from CR 103 and CR 104 and filter capacitors C 105, C 106 etc. is directed through the Series Pass transistors. The conduction of these transistors is controlled by circuitry which causes them to act as variable resistors. Their overall resistance varies in accordance with the need of the power supply to increase or decrease its output voltage or current. The Series Pass transistors are controlled by driver stages which amplify signals from the Error Amplifier.

Reference Supply, Comparator, Error Amplifier, and Current Limiting

A single integrated circuit, A1, combines the circuitry required to perform the task usually required by many discrete components.

The stable reference voltage is generated and indicated at the circuit reference V_{REF}. When A1 gets the zener regulated voltage across its terminals 5 and 8, a precision voltage reference is developed across its terminals 4 and 5. A fixed sample of this voltage is fed into terminal 2 which is one input of the error amplifier.

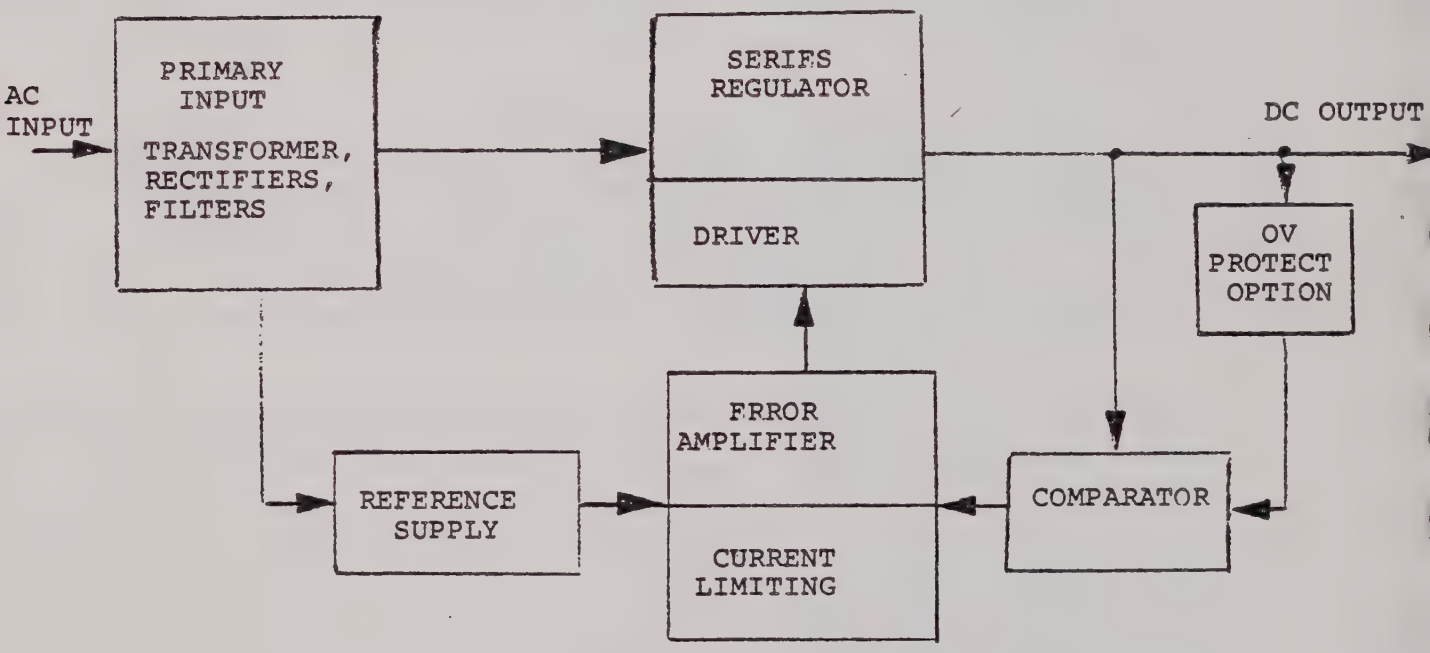
The voltage which A1 compares the reference voltage to, is fed into terminal 3. Any change in the output voltage is automatically compensated for as the error amplifier generates a correction drive signal at terminal 6 which changes the output voltage accordingly.

Current limiting is provided by input 10 which will control the error amplifier's output when an overcurrent condition is present.

Terminal 9 is a compensating input to A1, to insure stability and prevent oscillations under certain load conditions.

Overvoltage Circuit

A sample of the output voltage is developed across R20 and R21. This sample is brought to terminal 1 (anode) of the silicon unilateral switch (SUS), CR9, which has the characteristics of suddenly conducting when the applied voltage exceeds a minimum threshhold. When the SUS conducts it applies a gate signal to the SCR, CR106 which crowbars the output to nominal zero.



BLOCK DIAGRAM

Fig. 3-1

SECTION 4

CALIBRATION AND MAINTENANCE

4.1 GENERAL

The following adjustments should be made when necessary to assure optimum operating characteristics and maximum efficiency of the ValuPower series power supplies.

4.2 TEST EQUIPMENT REQUIRED (or equivalent)

(1) Systron-Donner Digital Multimeter Type 7205 or 7004

(2) External Current Shunt (Proper current rating chosen)

(3) Variable Auto transformer, 30 ampere rating

Shorting Link Application

For test purposes shorting links should be connected across rear panel barrier strip terminals -V and -S, -S and RVP, +S and +V, and PAR to provide local sensing and local voltage programming operation. To reduce pickup, shielded wire must be used for all connections between test equipment and the power supply being tested. To prevent ground loops, it is important that only one ground connection be made, as shown in Fig. 4-1. Tighten all terminals as securely as possible and set the front panel control CW.

4.3 CALIBRATION PROCEDURE

Ammeter Calibration (not required on VPL Series)

(1) Using a standard ammeter in series with an external load, adjust the load so the unit will operate at its maximum rated current (as indicated on the standard ammeter) and voltage output.

(2) Adjust ammeter adjust control R24 until ammeter M101 indicates the same current as the standard meter.

Current Limit Test

(1) Establish nominal output voltage

(2) Set current limit control R11 fully CW.

(3) Using an external load, apply a current overload to the unit under test.

(4) Adjust current limit control R11 until the overload, as indicated on ammeter MI, is limited to approximately 85A at the start of foldback.

Constant Voltage Operation

Load Regulation Test

With the equipment connected as shown in Figure 4-1, connect a suitable load resistance across the output terminal connections. The load resistance selected must be able to dissipate the rated power of the unit (P=IE) and must be of sufficient value to yield the rated output current when the rated voltage is applied. Note the voltage indicated on the Digital Voltmeter. Disconnect the resistive load from the output.

The maximum change in output DC voltage should not exceed by more than .05% or 5mv (whichever is greater) that of the output voltage indicated with the load resistance applied across the output terminals.

Line Regulation Test

Place the resistive load across the output and note the voltage indicated on the DVM. Vary the AC input power 10% above and below the nominal AC input level. The maximum change in output voltage should not exceed by more than $\pm$0.02% or 5 mv (whichever is greater) that of the output voltage measured at either extreme of the AC input.

Ripple Voltage Test

In order to reduce pickup, shielded test leads should be used in making ripple measurements. With the resistive load connected across the output terminals, measure the AC ripple with the AC scale of the DVM. Vary the AC input power 10% above and below the nominal AC input level. The maximum ripple amplitude should not exceed 1 mv PMS and 5mv P-P or 0.05% (whichever is greater).

Overvoltage Sensitivity

The trigger point of the OV protection circuit is determined by the setting of the OV control R21, located through the top cover. To set the OV circuit to trigger within the output range of the power supply, set R21 CW. Turn on the supply and adjust it for the desired OV firing point. Turn R21 CCW until the output voltage drops as indicated by the front panel voltmeter.

To set the OV circuit to fire at higher output voltage than the output voltage of the supply, a second current limiting type power supply is needed. With the supply under test, set its output voltage to any value. Turn R21 CW and connect the second supply across its output terminals. Set the second supply's output voltage to the desired OV firing point. Turn R21 CCW until the output of the supply drops to a low value as indicated on its voltmeter. This indicates that the OV circuit has fired at the voltage set on the second power supply.

4.4 MAINTENANCE

GENERAL

This power supply is a precision electronic instrument. It is strongly recommended that only experienced technical personnel perform troubleshooting operations or attempt to repair the unit. If the power supply appears to be malfunctioning at all, the following procedure is recommended for isolating possible defects.

Load and Interconnections

(1) Disconnect all loads and interconnections.

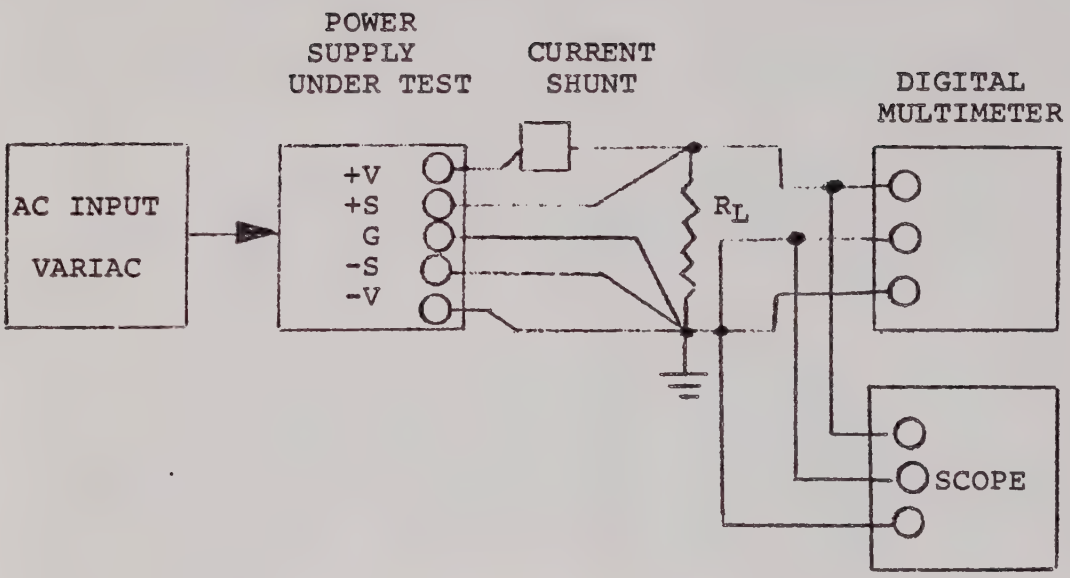
(2) Connect a resistive load across the output terminals and operate the unit to determine whether the fault lies within the unit or externally. Observe that shorting links are in place across terminals PAR to provide local sensing operation.

(3) Set input voltage to nominal value and operating controls for rated output. Satisfactory operation at this time would indicate that any malfunction previously encountered, is external in nature. All interconnections and loads normally used in conjunction with this power supply should then be carefully checked for electrical defects.

Troubleshooting

(1) Set Voltage Adjust and Voltage Vernier controls fully CW. Use a high impedance digital voltmeter to check the voltages across the various circuit components, as shown on the Schematic Diagram located at the rear of this instruction manual. Any sample voltages listed apply only if the unit is operating at its nominal AC input, and has a dummy load of sufficient size connected across its output to allow operation at maximum rated current and voltage output levels. Any reading which is grossly incorrect, indicates that the stage being tested or the one immediately preceding it is defective. The Block Diagram, Schematic Diagram, and appropriate sections of the Theory of Operation will prove helpful in any troubleshooting work. Proper polarity to be observed when testing can be easily obtained from the Schematic Diagram.

(2) If voltage checks show no noticeable deviations from the prescribed values, disconnect AC power and proceed with point-to-point resistance checks across pots, switches, diodes, resistors, transistors, in that order.



CONSTANT VOLTAGE OPERATION

TEST EQUIPMENT SET UP

Fig. 4-1

REPLACEABLE PARTS LIST

TITLE MODEL VP28-50/S7059

ITEM	REF	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	A1	INTEGRATED CIRCUIT, Voltage Regulator	27014	LM723CH	025756	1
	B101	FAN	92702	WS2107F-110	117823	1
	C1	CAPACITOR, Tant 100 µF -50V	56289	TE1309	810132	1
	C3	CAPACITOR, Ceramic Disc 101 µF 600V	71590	DD6-103	800090	2
	C4	CAPACITOR, Ceramic Disc 470 pF 20%, 600V	81349	CK05BX471K	800002	1
	C5	CAPACITOR, EL AX 35 µF 25V	56289	40D356G025DC4	810060	2
	C6	Same as C5				
	C7	CAPACITOR, Ceramic Disc .05 µF 100V	72982	845-024	800168	1
	C8	Same as C3				
	C9	CAPACITOR, Ceramic Disc .1 µF -100V	56289	TGP10	800176	1
	C11	CAPACITOR, Tant 68 µF -15V	56289	150D686X9015R2	100184	1
	C12	CAPACITOR, Tant 10 µF 10%, 20V	56289	150D106X9020B2	100063	1
	C13	CAPACITOR, Tant 50 µF -50V	56289	TE1307	810072	1
	C101	CAPACITOR, Met Mylar .1 µF -250V	52542	800185	800185	2
	C102	Same as C101				
	C103	CAPACITOR 2.2 µF -250V	27556	ZA2Z225K	800325	1
	C104	CAPACITOR, Met Film Polyest 1 µF -250V	52763	MKT1813-510/25	800304	1
	C105	CAPACITOR, EL 10,500 µF -75V	52542	820325	820325	6
	C106	Same as C105				
	C107	Same as C105				
	C108	Same as C105				
	C109	Same as C105				

REPLACEABLE PARTS LIST

TITLE MODEL VP28-50/S7059

ITEM	REF	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	C110	Same as C105				
	C111	CAPACITOR, EL 20,000 µF 35V	52542	820366	820366	1
	C112	CAPACITOR, EL 17,500 µF -20V	52542	820359	820359	1
	C113	CAPACITOR, Met Mylar .1 µF -600V	27556	ZA2G104K	106416	1
	C114	CAPACITOR, Met Film Polyest .22 µF -250V	52763	MKT1813-422/25	800252	2
	C115	Same as C114				
	CB1	CIRCUIT BREAKER 50A	73135	AM1-A3-A-50-2	760181	1
	CR1	DIODE, Rectifier 400V	04713	1N5395	100413	6
	CR2	Same as CR1				
	CR3	DIODE, Zener 11V 5%, 1W	04713	1N4741A	720410	1
	CR4	DIODE, Zener 6.2V 5%, .4W	03877	1N753A	100387	1
	CR5	DIODE, Zener 5.1V 5%, .4W	03877	1N751A	100378	2
	CR6	Same as CR1				
	CR7	Same as CR1				
	CR9	DIODE, Thyristor	03508	2N4990	741001	1
	CR10	DIODE	03877	1N746A	100415	
	CR11	DIODE, Signal	04713	1N4148	720440	1
	CR12	Same as CR1				
	CR13	Same as CR1				
	CR101	DIODE, Rectifier 50V	04713	MR1120	720129	2
	CR102	Same as CR101				
	CR103	DIODE, Rectifier 100V	58849	S4110	725089	2
	CR104	Same as CR103				
	CR106	DIODE, SCR 50V	58849	70C050IL	720047	1
	CR107	DIODE, Rectifier	81483	41HF10	720329	1
	CR108	DIODE, Rectifier 600V	81483	1N2138	720488	1

REPLACEABLE PARTS LIST

TITLE MODEL VP28-50/S7059

ITEM	REF	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	CR109	DIODE, Rectifier 400V	04713	1N5395	100413	1
	DS101	LAMP, Pilot	91802	1040D32	770020	1
	L101	CHOKE	52542	504085	504085	1
	M101	ASSEMBLY, Meter 80A	52542	06504601	06504601	1
	M102	ASSEMBLY, Meter Volt 40V	52542	06507202	06507202	1
	Q1	TRANSISTOR,	07263	2N2219A	705068	1
	Q101	TRANSISTOR, NPN	02735	2N6258	700088	2
	Q102	Same as Q101				
	Q103	TRANSISTOR, SINPN	04713	2N3738	102738	1
	Q105	TRANSISTOR, NPN	02735	2N6258	700088	8
	Q108	Same as Q105				
	Q109	Same as Q105				
	Q110	Same as Q105				
	Q111	Same as Q105				
	Q114	Same as Q105				
	Q116	Same as Q105				
	Q118	Same as Q105				
	Q120	TRANSISTOR, NPN	02735	2N6258	700088	8
	Q121	Same as Q120				
	Q123	Same as Q120				
	Q124	Same as Q120				
	Q125	Same as Q120				
	Q127	Same as Q120				
	Q128	Same as Q120				
	Q130	Same as Q120				
	R1	RESISTOR, WW 470 Ω 10%, 2W	81483	BWH	640440	1
	R2	RESISTOR, Variable 500 Ω 10%, .5W	73138	72PR500	600133	2
	R3	Same as R2				
	R4	RESISTOR, MF 1.18 K 1%, 1/4W	81349	RN65D1181F	620320	1

REPLACEABLE PARTS LIST

TITLE MODEL VP28-50/S7059

ITEM	REF	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	R5	RESISTOR, MF 6.65 k 1%, 1/4W	81349	RN65D6651F	620593	1
	R6	RESISTOR, MF 4.64 k 1%, 1/2W	81349	RN65D4641F	620534	1
	R7	RESISTOR, MF 1.96 k 1%, 1/2W	16299	RN65D1961F	620402	1
	R8	RESISTOR, CC 2.2 Ω 5%, 1/2W	01121	EB22G5	106012	2
	R11	RESISTOR, Variable 100 Ω 1/2W			600046	4
	R12	RESISTOR, CC 3.3 k 5%, 1/2W	01121	EB3325	101432	2
	R13	Same as R12				
	R14	Same as R8				
	R15	RESISTOR, WW 2.5 k 3%, 3W	15915	TS3	630450	1
	R16	Same as R11				
	R17	RESISTOR, WW 250 Ω 5%, 10W	12697	VC10F	640400	2
	R18	Same as R17				
	R19	RESISTOR, WW 200 Ω 5%, 5W	12697	VC5F	640389	1
	R20	RESISTOR, WW 47 Ω 10%, 2W	12697	VC2F	640280	1
	R21	Same as R11				
	R22	RESISTOR 1.5 k 5%, 1/2W	01121	EB1525	101459	1
	R23	RESISTOR, CC 1 k 5%, 1/2W	01121	EB1025	101467	2
	R24	Same as R11				
	R27	RESISTOR, CC 4.7 k 5%, 1/2W	01121	EB4725	101511	2
	R28	RESISTOR, CC 6.8 k 5%, 1/2W	01121	EB6825	101510	1

REPLACEABLE PARTS LIST

TITLE MODEL VP28-50/S7059

ITEM	REF	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	R29	Same as R23				
	R30	RESISTOR, CC 220 Ω 5%, 1/2W	01121	EB2215	101667	1
	R31	Same as R27				
	R32	RESISTOR, CC 2.2 k 5%, 1/2W	01121	EB2225	101454	1
	R101	RESISTOR .47 Ω 10%, 2W			640069	2
	R102	Same as R101				
	R103	RESISTOR, CC 1 k 10%, 1/2W	01121	EB1025	101467	1
	R105	RESISTOR, WW .3 Ω 3%, 5W	15915	TSK5.3 3%	117466	16
	R108	Same as R105				
	R109	Same as R105				
	R110	Same as R105				
	R111	Same as R105				
	R114	Same as R105				
	R116	Same as R105				
	R118	Same as R105				
	R120	Same as R105				
	R121	Same as R105				
	R123	Same as R105				
	R124	Same as R105				
	R125	Same as R105				
	R127	Same as R105				
	R128	Same as R105				
	R130	Same as R105				
	R131	RESISTOR, CC 100 Ω 5%, 1/2W	01121	EB1015	101498	1
	R132	RESISTOR 10 Ω 5%, 2W	01121	HB1005	640190	1

REPLACEABLE PARTS LIST

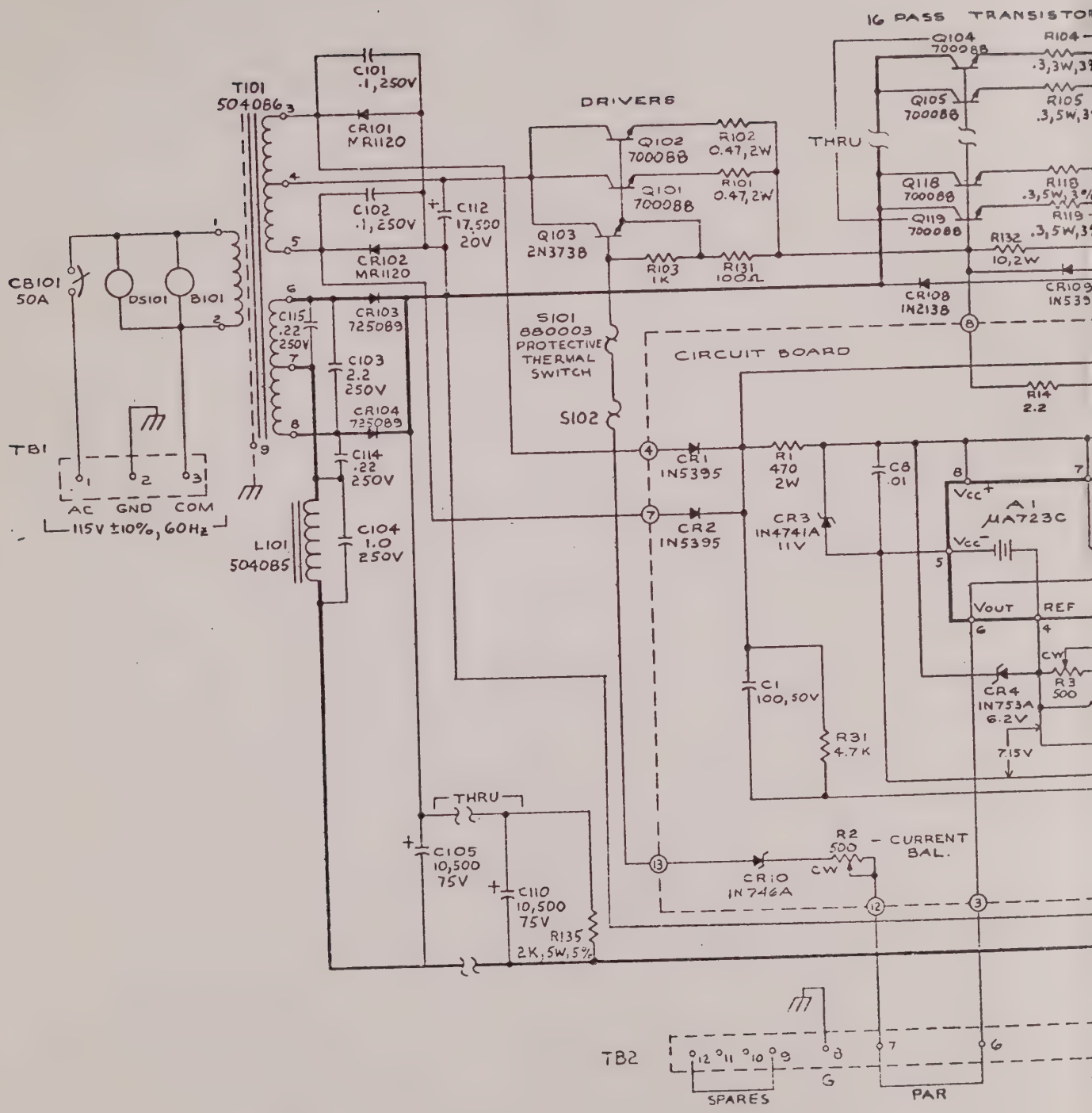
TITLE MODEL VP28-50/S7059

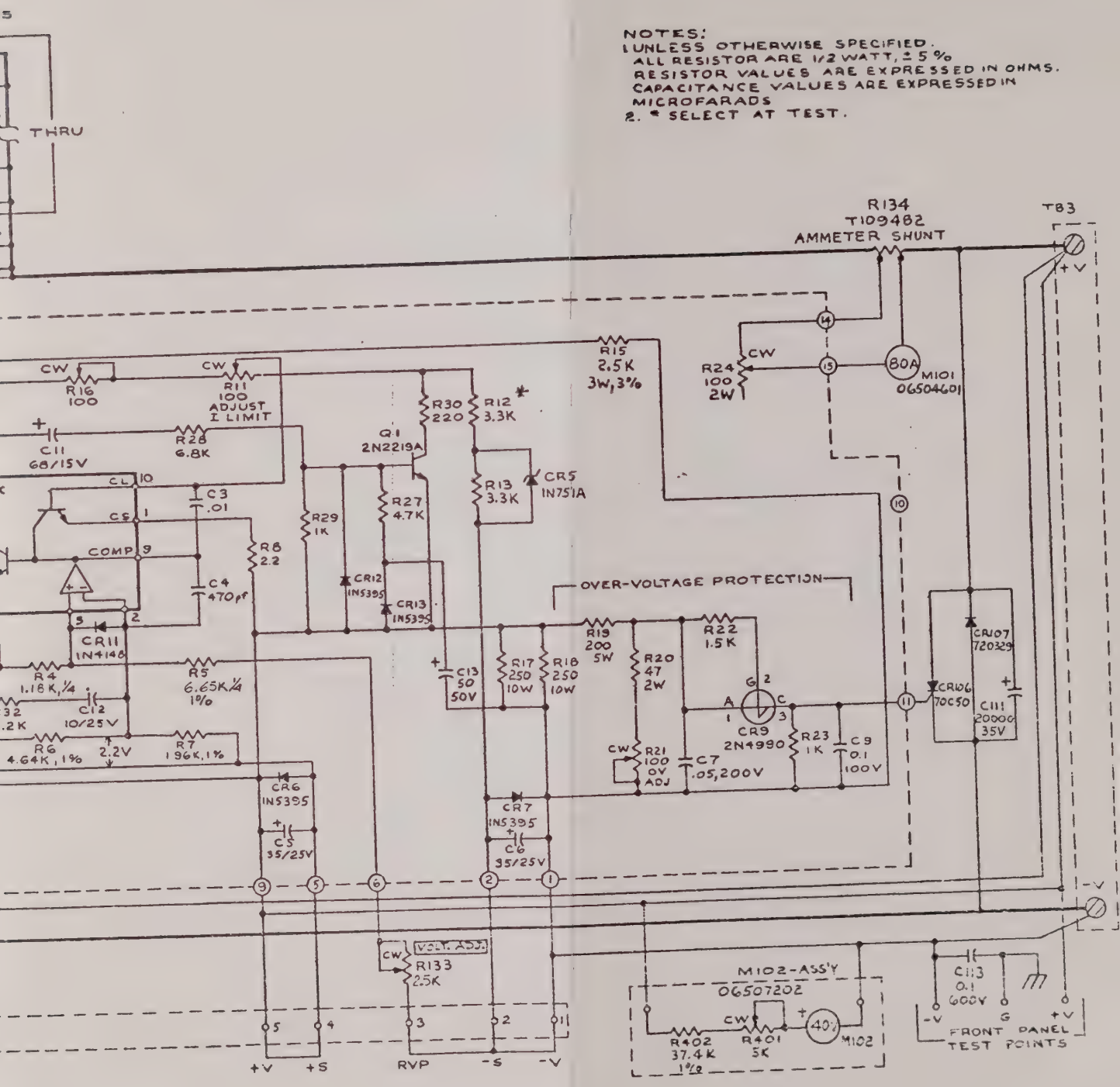
ITEM	REF	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	R133	RESISTOR, Variable 2.5 k 10%, 2W	81349	RA20NASD2528	600220	1
	R134	SHUNT .002	52542	T109482	T109482	1
	R135	RESISTOR, WW 2 k 5%, 5W	83777	WL5	640530	1
	R401	RESISTOR, Variable 5 k 10%, 5W	73138	72XLR5K	117124	1
	R402	RESISTOR, MF 37.4 k 1%	19701	MF5C-D-3742-F	102145	1
	T101	TRANSFORMER	52542	504086	504086	1
	S101	THERMAL, Switch	52542	880003	880003	1
	S102	Same as S101				
	XQ101	TRANSISTOR, Socket	22753	PTS-2	830101	18
	XQ102	Same as XQ101				
	XQ103	TRANSISTOR, Socket	88625	4613	830103	1
	XQ105	Same as XQ101				
	XQ108	Same as XQ101				
	XQ109	Same as XQ101				
	XQ110	Same as XQ101				
	XQ111	Same as XQ101				
	XQ114	Same as XQ101				
	XQ116	Same as XQ101				
	XQ118	Same as XQ101				
	XQ120	Same as XQ101				
	XQ121	Same as XQ101				
	XQ123	Same as XQ101				
	XQ124	Same as XQ101				
	XQ125	Same as XQ101				
	XQ127	Same as XQ101				
	XQ128	Same as XQ101				
	XQ129	Same as XQ101				

REPLACEABLE PARTS LIST

TITLE MODEL VP28-50/S7059

ITEM	REF	COMPONENT DESCRIPTION	MFR'S CODE	MANUFACTURER'S PART NUMBER	SD STOCK NUMBER	T/Q
	-V	TIP JACK, Black	74970	105-0253-001	T920190	1
	+V	TIP JACK, Red	74970	105-0252-001	T920260	1
	GND	TIP JACK, White	74970	105-251-1-001	T920258	1
		BOARD, PC P/O M102	52542	065048	065048	1
		HEATSINK #1	52542	065518	065518	1
		HEATSINK P/O XQ120, etc	52542	065554	065554	8
		HEATSINK #2	52542	065518	065518	1
		HEATSINK P/O XQ105, 108,etc	52542	065554	065554	8
		STRIP, Barrier	75382	599-2004-12	850039	1
		STRIP, Barrier	75382	671-Y-3	851303	1
		LINK, Shorting	75382	600J	840217	4
		BOARD, PC Assembly	52542	PD28071	PD28071	1
		BOARD, PC	52542	T112256	T112256	1


16 PASS TRANSISTOR
T101
504086
C101
.1, 250V
CR101
MR1120
C102
.1, 250V
CR102
MR1120
C112
17,500
20V
DRIVERS
Q102
700088
R102
0.47, 2W
Q101
700088
R101
0.47, 2W
Q103
2N3738
R103
1K
R131
100Ω
THRU
Q104
700088
Q105
700088
Q118
700088
Q119
700088
R104
.3, 3W, 3%
R105
.3, 5W, 3%
R118
.3, 5W, 3%
R119
.3, 5W, 3%
R132
10, 2W
CR108
IN2138
CR109
IN539
CB101
50A
DS101
B101
TB1
AC GND COM
115V ±10%, 60Hz
C115
.22
250V
CR103
725089
C103
2.2
250V
CR104
725089
C114
.22
250V
C104
1.0
250V
L101
504085
S101
880003
PROTECTIVE
THERMAL
SWITCH
S102
CIRCUIT BOARD
R14
2.2
CR1
IN5395
CR2
IN5395
R1
470
2W
CR3
IN4741A
11V
C8
.01
A1
μA723C
Vcc+
Vcc−
VOUT
REF
CW
R3
500
CR4
IN753A
6.2V
7.15V
C1
100, 50V
R31
4.7K
THRU
C105
10,500
75V
C110
10,500
75V
R135
2K, 5W, 5%
R2
500
CW
CURRENT
BAL.
CR10
IN746A
TB2
SPARES
PAR



MODEL
VP28-50 S7059
D065521

ITEM NO	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY LEVEL OR CODE	QTY	CHT QTY
1	006160	SHIPPING ASS'Y		XX		
3D		SCHEMATIC	T115640		1	R
6A	PD26790	FRONT PANEL ASS'Y			1	2
7D	T115334	" " FINISH			1	2
8B	06507302	METER ASS'Y 60V	M102		1	2
9B	06502501	METER MVMT 1mA 77Ω			1	1
10	117114	DIAL BLANK	B-065073		1	1
11B	065048	PC BD (METER MULTIPLIER)			1	2
12	117124	POT. 1TW.W. 5K	R401		1	1
13	117127	RES. 57.6KΩ	R402		1	1
14	103862	HEX NUT			2	1
15A	06507901	METER ASS'Y 50A	M101		1	2
16B	06502501	METER MVMT 1mA 77Ω			1	1
17	117114	DIAL BLANK	B-065079		1	1
18	085900	NAME-PLATE			1	1
19	600300	POT. 5K-2W	R133		1	1
20	760181	CIRCUIT BRKR 50A	CB1		1	1
21	770020	PILOT LAMP	DS101		1	1
22	840220	SHAFT LOCK			1	1
23	T920190	TIP JACK BLACK			1	1
24	T920260	" " RED			1	1
25	T920258	" " WHITE			1	1
26	T920010	HANDLES			2	1
27	106416	CAP. .1mf-600V	C113		1	1
28		FRONT PANEL WIRING	PD26766		1	R
29	620704	RES 45.3KΩ 1/2W 1%	R136		1	1

MODEL	JOB NO.	LOT QTY	LOT NO.	CODE IDENT
				52542

PLANNER PREP DATE SYSTRON ASSY DRAWING

CHKD

MAT. SPEC APPD

SHIPPING ASS'Y
VP48-30MOV

SND REL

006160

SHEET 1 OF 7

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	ISS. CODE	SERV QTY	ISS. CODE
34B	PD26757	MAIN CHASSIS ASS'Y		1	2		
35D	T115374	" "		1	2		
36A	504196	TRANSFORMER	T101	1	2		
37	504195	CHOKE	L101	1	2		
38	106664	FAN	B101	1	1		
39C	T111894	SHROUD		1	2		
40	102776	4-40 X 3/8 NYLON SCREWS		2	R		
41	T900111	CAP. BRKT		1	1		
42C	T109932	INSULATOR PLATE		1	2		
43	T990400	NYLON NUT		3	R		
44	840192	RUBBER FEET		4	1		
45C	T109902	BUSS		1	2		
46C	T109462	" (POS. OUTPUT)		1	2		
47C	T109452	" (NEG. OUTPUT)		1	2		
48C	T111852	" (DIODE POS)		1	2		
49C	124322	SHUNT .003	R134	1	2		
50	117333	P.C. BOARD SUPPORT		4	1		
51D	T109272	CAP. CLAMP		1	2		
52	820163	CAP. 2500μf-150V	C105, 106,	4	1		
53		S/A C105	107, 108,			R	
54							
55	800304	1nf-250V	C104	1	1		
56	800325	2.2μf-250V	C103	1	1		
57	820359	17,500μf-20V	C112	1	1		
58	800252	CAP .22μf-250V	C115, 114	2	1		
59	640554	RES. 8K 5W 5%	R135	1	1		
60	057020	BRACKET BLOWER		2	1		
64B	PD26754	SUB-CHASSIS ASS'Y		1	2		
65D	T109942	" "		1	2		
66B	T100712	CAP. CLAMP		1	1		

MODEL | JOB NO. | LOT QTY | LOT NO. | CODE IDENT. 52342

PLANNER | PREP | DATE | INSTRON CORPORATION DONNER

DRWD | CHKD | APPD

SHIPPING ASSY VP48-30-MOV

006160

SHEET 2 OF 7

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSEMBLY QUANTITY	UNIT QTY
		SUB-CHASSIS ASS'Y (CONT.)		XX	
68	820319	CAP. 10,000uf-60V	C111	1	1
69	860055	CERAMIC STANDOFF		2	1
70	T900003	ANGLE BRACKET		2	1
71	T990405	NYLON NUT		4	R
72	720129	DIODE, MR1120	CR101, 102	2	1
73B	T109862	BUSS EMITTER CONN.		1	2
74	800185	CAP. .1mf-250V	C101, 102	2	1
75	116969	LUG		2	R
79B	PD26751	HEATSINK ASS'Y #1		1	2
80D	T109912	HEATSINK		1	2
81C	T109882	BUSS		1	2
82	700410	TRANSISTOR 2N3442	Q120, Q121	8	1
83		S/A Q120	Q123, Q124		R
84		S/A Q120	Q125 Q127		R
85		S/A Q120	Q128 Q130		R
86	830101	TRANSISTOR SOCKET		8	1
87	630019	RES. .5Ω 5w 3%	R120, R121	8	1
88		S/A R120	R123, R124		R
89		S/A R120	R125, R127		R
90		S/A R120	R128, R130		R
91	T990405	NYLON NUT		1	R
92		HEATSINK #1 WIRING	PD26758	1	R
96B	PD26752	HEATSINK ASS'Y #2		1	2
97D	T109912	HEATSINK		1	2
98C	T109882	BUSS		1	2
99	830101	TRANSISTOR SOCKET		7	1

MODEL | JOB NO. | LOT QTY. | LOT NO. | CODE IDENT NO. 52542

PLANNER | DRAWN | DATE | SYSTRON DONNER CORPORATION

CHKD | APPD | SHIPPING ASS'Y VP48-30 MOV

MATL SPEC | APPD

006160

SHEET 3 OF 7

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	QUAN PER ASSY	USE CODE
		HEATSINK ASS'Y #2 (CONT)		XX	
101	700410	TRANSISTOR, 2N3442	Q108, Q109	7	I
102		S/A Q108	Q110, Q111		R
103		S/A Q108	Q114, Q116		R
104		S/A Q108	Q118		R
105	100413	DIODE IN5395	CR109	1	I
106	630019	RES. .5Ω 5W 3%	R108-R111	7	I
107		S/A R108	R114, R116		R
108	116969	LUG		1	R
109		S/A R108	R118		R
110	T990405	NYLON NUT		1	R
111A		HEATSINK #2 WIRING	PD26759	1	R
112	640190	RES 10Ω 2W 10%	R132	1	I
115B	PD26753	HEATSINK ASS'Y #3		1	2
116D	124332	HEATSINK		1	2
117C	T109882	BUSS		1	2
118	720488	DIODE, IN2138/60HF60	CR103, 104	2	I
119	720335	DIODE, IN1184A	CR108	1	I
120	102738	TRANSISTOR, 2N3738	Q103	1	I
121	700410	2N3442	Q101, 102,	4	I
122		S/A Q101	105, 107		R
123	830101	TRANSISTOR SOCKET		4	I
124	830103	" "		1	I
125	880003	THERMAL SWITCH	S101	1	I
126	640069	RES. .47Ω 2W 10%	R101, 102	2	I
127	630019	.5Ω 5W	R105, 107	2	I
128	101467	1K-½W-10%	R103	1	I
129	101498	100Ω-½W-10%	R131	1	I
130	860070	STANDOFF #6		2	I
131	T990405	NYLON NUT		1	R
132		HEATSINK #3 WIRING	PD26760	1	R

MODEL | DWG NO. | LOT QTY | LOT NO. | ISSUE DATE

PLANNER | PREP | DATE | SYSTRON DONNER CORPORATION

SHIPPING ASS'Y
VP48-30 MOV

006160

SHEET 4 OF 7

	PART NUMBER	DESCRIPTION	SCHEMATIC NO.	UNIT QTY	NOT USED ON THIS ASSY QTY	SPARE PART QTY
137A	PD26768	DIODE BRKT ASS'Y		1	2	
138C	T109442	DIODE BRKT		1	2	
139	720335	DIODE, 41HF10	CR107	1	1	
140	720053	SCR 2N2025	CR106	1	1	
141						
142						
143A		DIODE BRKT/SHUNT WIRING	PD26769	1	R	
147A	PD26755	REAR CHASSIS ASS'Y		1	2	
148B	T109472	OUTPUT INSULATOR		1	2	
149B	081468	COVER AC		1	2	
150	850039	BARRIER STRIP		1	1	
151	851303	" "		1	1	
152	860100	HEX SPACER 1/2"		2	1	
153	T101040	NAMEPLATE		1	R	
154	840217	LINK		4	1	
155A		REAR CHASSIS WIRING	PD2676A	1	R	
159C	PD26748	P.C. BOARD ASS'Y		1	2	
160D	T112256	" "		1	2	
161	100063	CAP. 10μf-25V	C12	1	1	
162	810060	35μf-25V	C5, C6	2	1	
163	102598	100μf-50V	C1	1	1	
164	810040	20μf-100V	C13	1	1	
165	821006	68μf-15V	C11	1	1	

MODEL | TYPE NO. | QTY | LOT NO. | CODE IDENT NO. 52542

PLANNER | PREP | DATE | SYSTEM | DONIER

SHIPPING ASS'Y
VP48-30 MOV

006160

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	ASSY QTY	LOT QTY	SUB QTY	UNIT QTY
		P.C. BOARD ASS'Y (CONT)		XX			
167	100134	CAP. .05μf-200V	C7	1	1		
168	100178	.1μf-100V	C9	1	1		
169	800090	.01μf-600V	C3, C8	2	1		
170	800002	470pf	C4	1	1		
174	100395	DIODE, IN758A	CR5	1	1		
175	100387	IN753A	CR4	1	1		
176	100413	IN5395	CR1, 2, 6, 7,	6	1		
177		S/A CR1	12, 13			R	
178	720410	IN4741A	CR3	1	1		
179	720440	IN4148	CR11	1	1		
180	100378	IN751A	CR10	1	1		
184	025756	IC, MC1723	A1	1	1		
187	106587	TRANSISTOR, 2N2219A	Q1	1	1		
190	741001	SCR, 2N4990	CR9	1	1		
193	117188	RES, POT. 100Ω-½W	R11, 16, 21, 4	1			
194		S/A R11	24			R	
195	600133	POT. 500Ω	R2	1	1		
196	600207	POT. 2KΩ	R3	1	1		
197	106012	2.2Ω-½W-5%	R14, 8	2	1		
198	101432	3.3K	R12	1	1		

MODEL | DWG NO. | LOT QTY | LOT NO. | CODE IDENT 52042

PLANNER | PREP | DATE | SYSTRON DONNER CORPORATION

CHKD | APPD | MFG ENGR | MFG QUAL | SHIPPING ASS'Y VP48-30 MOV

006160

SHEET 6 OF 7

ITEM NO.	PART NUMBER	DESCRIPTION	REFERENCE NO.	QUANTITY PER ASS'Y	QUANTITY PER DASH NO.
		P.C. BOARD ASS'Y (CONT)		XX	
200	101667	RES. 220Ω - ½W	R30	1	1
201	101454	2.2K - ½W	R32 R13	2	1
202	101467	1K - ½W	R23, 29	2	1
203	101511	4.7K - ½W	R27, 31	2	1
204	101510	6.8K - ½W	R28	1	1
205	620402	1.96K - ½W - 1%	R7	1	1
206	620436	2.26K - ½W - 1%	R4	1	1
207	620684	28.7K - ½W - 1%	R5	1	1
208	620534	4.64K - ½W - 1%	R6	1	1
209	640520	1K - 10W	R17, 18	2	1
210	640460	500Ω - 5W - 5%	R19	1	1
211	640280	47Ω - 2W - 10%	R20	1	1
212	101459	1.5K - ½W - 5%	R22	1	1
213	640440	470Ω 2W - 10%	R1	1	1
214					
215	630450	2.5K - 3W - 3%	R15	1	1
216					
218	PD2380601	AC - DC HARNESS		1	2
219	PD23806	" " " LIST			R
220	VP-1	" " " LAYOUT			R
222	PD26770	JUMPER LIST		1	2
223		P.C. BOARD WIRING	PD26765	1	R
224		FAN WIRING	PD26763	1	R
225		XFORMER WIRING	PD26761	1	R
		CHOKE WIRING	PD26762	1	R
227	PD26767	TOP COVER ASS'Y		1	2
228	T115384	" "		1	2

MODEL | JOB NO. | LOT QTY | LOT NO. | CODE IDENT. 52542

PLANNER | PREP | DATE | SHOP ORDER NUMBER | DRAWER

DESCRIPTION: SHIPPING ASS'Y VP48-30 MOV

CHKD | APPD | MFG. DUE | STD REQ. | NEXT ASSY

006160

SHEET 7 OF 7